

CHANNA MELANOSTIGMA, A NEW SPECIES OF FRESHWATER SNAKEHEAD FROM NORTH-EAST INDIA (TELEOSTEI: CHANNIDAE)

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Channa melanostigma, a new channid fish species is described from north-east India. The species is distinguished from all its congeners by a combination of the following characters: 14-15 black zig-zag transverse bars at irregular intervals on caudal fin (when stretched), the interspaces being $2/3^{\text{rd}}$ of the bars; dorsal fin inserted after 3-4 scales vertically above the pectoral fin origin, $1/27$ - $1/8$ scales below the lateral line, 5 cheek scales, 27-28 circumpeduncular scales, 50-51 vertebrae, 7 branchial tooth plates, 36-37 branched dorsal fin rays and last dorsal fin inserted in between 41 and 43 vertebrae.

Key words: Channid fish, new species, Arunachal Pradesh

INTRODUCTION

Freshwater snake-headed fishes of the Family Channidae is represented by 31 species, of which 28 are of Asian genus *Channa* Scopoli and three of African genus *Parachanna* Li *et al.* (2005). All species in this genus have cavities in the head which act as a primitive lung enabling them to live for long time out of water (Shaw and Shebbeare 1937).

North-east India having many derelict swamps is rich in channid fauna. Hamilton (1822) described *Ophiocephalus barca* from Brahmaputra river, Assam; *O. gachua* from ponds and ditches of Bengal and *O. marulius* from Gangetic provinces, India. McClelland (1845) described *O. amphibius* from the vicinity of Chel river, North Bengal. Playfair (1867), Vierke (1991) and Musikasinthorn (2000) respectively described *O. stewartii*, *Channa bleheri* and *C. aurantimaculata* from Assam. Shaw and Shebbeare (1937) and Menon (1954), listed *O. striatus* and *O. punctatus* respectively from North Bengal and Manipur. All the above species are now in *Channa*. The works of Sen (1999), Nath and Dey (2000) and Sen (2006) on the fishes of Arunachal Pradesh did not include any additional species of *Channa*. Vishwanath and Geetakumari (2009) provided diagnostic characters of nine species of *Channa* from North-east India and studied their inter-relationships. Recently, Bagra *et al.* (2009) included an unidentified species, *Channa* sp. 1, in their checklist of fishes of Arunachal Pradesh, which was also collected from the type locality of the new species under description.

Collections from Lohit river (Brahmaputra basin), Arunachal Pradesh, in 2007, included an unnamed species of *Channa* which is herein described as *Channa melanostigma*, a new species.

MATERIAL AND METHODS

Measurements were made point to point with dial calipers to the nearest 0.1 mm. Counts and measurements were made on the left side of specimens under a PC-based binocular stereozoom microscope with transmitted light. Counts and measurements followed Musikasinthorn (1998). Clearing and staining of specimens for osteology followed Hollister (1934). Identification and nomenclature of bones and vertebral counts followed Greenwood (1976). As the gill rakers in the genus are modified to form toothplate, we use the term 'branchial toothplate count' instead of gill raker count following Greenwood (1976). The count was taken on the first gill arch starting from hypobranchial to epibranchial on the left side of the specimens. Measurements of head length and body parts are expressed as proportions of standard length (SL) while subunits of the head, as proportions of head length (HL). Material examined in this study is deposited in Manipur University Museum of Fishes (MUMF).

Channa melanostigma sp. nov. (Fig. 1)

Material examined: **Holotype:** MUMF-Per 39, 134.8 mm SL; India: Arunachal Pradesh: Lohit district, Lohit river, Brahmaputra drainage: Tezu, 27° 54' 41" N, 96° 10' 23" E; K. Nebeshwar Sharma, 29.iii.2007.

Paratypes: 7 specimens, MUMF-Per 40-46, 6, 82.1-143.0 mm SL; same data as for holotype, MUMF-Per 45 and 46 dissected, cleared and stained for osteology.

Diagnosis: *Channa melanostigma* is distinguished from its nearest congener *C. stewartii* in having distinct 14-15 black zigzag transverse bars at irregular intervals (when stretched), the interspaces being $2/3^{\text{rd}}$ of the bars on the caudal fin (Fig. 2a) vs. no black zigzag bars in the caudal fin (Fig. 2b);



Fig. 1: Side view of *Channa melanostigma* sp. nov., paratype, MUMF-Per 40, 112.5 mm SL

dorsal fin origin after 3-4 scales vertically above the pectoral fin origin vs. vertically above the pectoral origin, vertebra 50-51 vs. 44, branchial toothplate count 7 vs. 3 and more number of scales below the lateral line $\frac{1}{2}7\text{-}\frac{1}{2}8$ vs. $\frac{1}{2}5$. It is also distinguished from *C. gachua* in having more number of vertebra (50-51 vs. 43), toothplate count (7 vs. 9), last dorsal fin ray inserted in between 41st and 43rd vertebrae (vs. 35th and 36th). In case of *C. gachua* the juveniles have a very distinct ocellus at the posterior end of the dorsal fin base but the ocellus is completely absent in case of the *C. melanostigma*. It differs from *C. aurantimaculata* in having less number of dorsal fin rays (36-37 vs. 45-47), last dorsal finray inserted between 41st and 43rd vertebrae (vs. 46th and 47th), cheek scales 5 vs. 10 and less number of circumpeduncular scales (28 vs. 34).

Description: Morphometric data are in Table 1. Dorsal fin 36-37 simple rays. Anal fin 24-25 simple rays, pectoral fin one simple and 14-15 branched rays, pelvic fin 5 simple rays, caudal fin 14 branched rays, predorsal scales 13-14, lateral line scales dropping one row following 15-17th anterior-

most scales. Two large cycloid scales on each side of lower jaw, transverse scales $\frac{1}{2}3\text{-}\frac{1}{2}4/1\frac{1}{2}7\text{-}\frac{1}{2}8$, caudal fin with 14-15 black zigzag bars, black spots throughout the flank, 12-14 alternate black and whitish transverse bars on the body, cheek scales 5-6, circumpeduncular scales 27-28, scales below the lateral line $\frac{1}{2}7\text{-}\frac{1}{2}8$, total vertebrae 50-51; last ray of dorsal fin in between 41-43 vertebrae, precaudal + caudal vertebrae = 44-45+6, toothplate count 7. Cephalic sensory pores single, without satellite openings. Body elongated, cross-section almost circular in anterior portion and somewhat compressed posteriorly. Body depth greatest at ventral fins origin. Body widest at pectoral fin origin. Dorsal and anal fin bases long (56.9-62.6% SL and 37.7-44.3% SL, respectively). Head depth 11.7-14.6% HL, head width 15.9-20.9% HL, body depth 14.4-15.3% SL, caudal peduncle depth 9.7-10.75% SL, pelvic fin length 7.4- 9.2% SL.

Outer margins of pectoral and caudal fins rounded. Dorsal fin origin after 3-4 scales vertically above the pectoral fin origin. Head elongated 26.9-31.3% SL, concave in lateral view. Snout narrow, dorsal profile of snout somewhat convex.

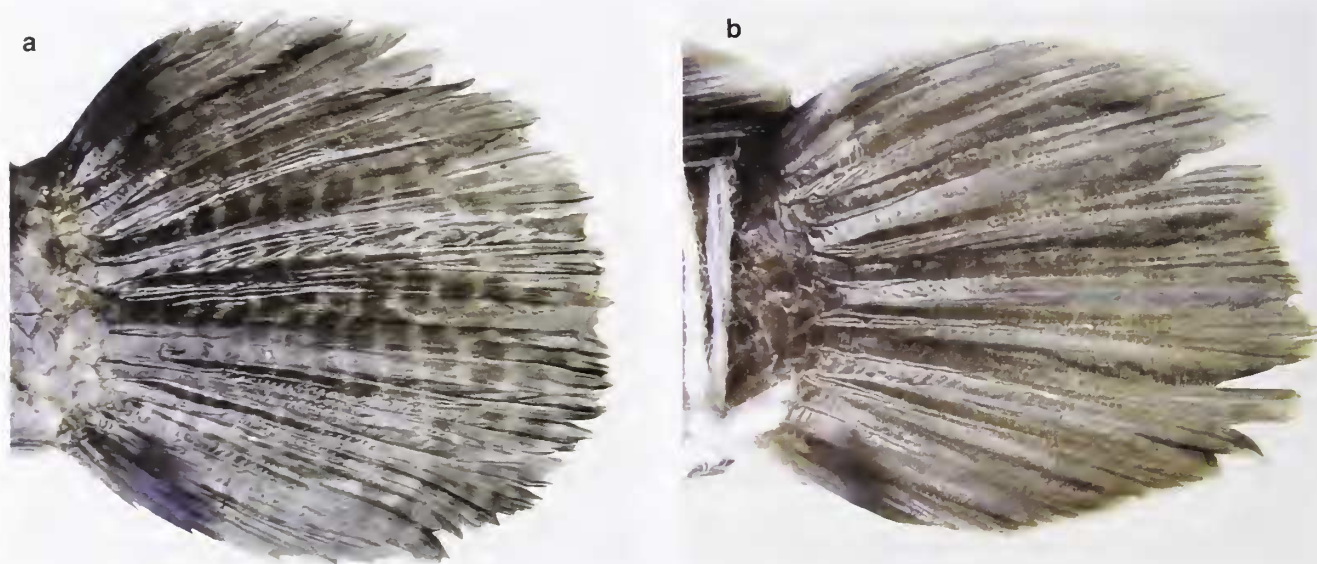


Fig. 2: Comparison of caudal fins: a. *Channa melanostigma* sp. nov. (paratype, MUMF-Per 40, 112.5 mm SL) stretched, b. *C. stewartii* (MUMF-Per 21, 109.7 mm SL)

NEW DESCRIPTIONS

Table 1: Biometric data of *Channa melanostigma* sp. nov. and *C. stewartii* except SL and HL in mm

	<i>C. melanostigma</i> sp. nov.				<i>C. stewartii</i>	
	Holotype MUMF- Per/39	Paratypes MUMF-Per/40-45 (n=6) (Lohit)			MUMF-Per/21, 22 (n=2)	Goswami <i>et al.</i> (2006) (n=6)
SL (mm)	134.8	82.1-143.0			109.7-155.2	148.0-157.0
% SL		mean	range	S.D.		
Head length	30.8	29.8	26.9-31.3	1.91	30.8-30.9	29.3-30.7
Head depth	14.4	13.6	11.7-14.6	1.38	15.0-16.4	14.0-14.7
Head width	19.9	18.8	15.9-20.9	1.96	20.1-21.4	19.0-19.8
Body depth	17.4	15.4	14.4-15.3	1.03	17.9-18.3	14.0-15.9
Body width	13.6	12.5	10.7-14.3	1.34	12.1-13.3	11.8-12.7
Caudal peduncle length	10.2	10.3	9.9-11.0	0.41	10.0-11.2	10.0-11.0
Caudal peduncle depth	10.8	10.2	9.7-10.7	0.51	10.8-11.2	10.3-11.2
Predorsal length	35.3	34.2	31.6-35.7	3.90	32.9-33.9	31.9-35.5
Preanal length	53.1	51.5	47.8-53.1	1.93	48.6-52.5	50.0-53.3
Prepectoral length	32.0	30.8	27.8-32.6	2.16	32.1-34.1	28.7-32.5
Prepelvic length	37.2	34.4	29.6-37.6	3.90	35.6-37.4	35.0-37.7
Dorsal fin base length	56.9	59.2	58.3-62.6	2.11	61.7-64.6	59.2-61.7
Anal fin base length	37.7	40.9	39.7-44.3	2.68	39.2-39.7	37.0-39.2
Pectoral fin length	18.3	18.3	17.1-20.0	1.04	19.4-19.8	17.8-19.8
Pelvic fin length	7.7	8.1	7.4-9.2	0.69	6.1-7.1	7.0-7.6
Head length (mm)	41.5	39.3	32.4-41.5	3.59	34-47.9	4.3-4.7
% HL						
Head depth	46.9	45.3	42.3-46.6	1.89	48.5-53.0	46.5-48.9
Head width	64.0	62.7	57.2-66.9	3.50	65.0-69.3	64.0-66.0
Snout length	19.5	21.8	21.8-23.1	1.37	21.5-21.8	No data
Eye diameter	14.5	14.9	14.3-15.6	0.61	13.9-15.6	14.6-16.0
Preorbital head depth	24.8	25.0	23.4-26.5	1.19	24.2-30.9	21.1-31.9
Postorbital head length	68.2	66.7	63.8-68.8	2.23	66.8-69.5	65.4-69.2
Postorbital head depth	34.7	32.5	29.6-34.9	2.29	24.2-30.9	No data
Interorbital width	34.9	33.3	31-35.3	1.97	32.9-38.4	30.4-35.6
Upper jaw length	40.5	42.5	40.1-48.7	3.52	41.1-45.9	30.9-37.4

Interorbital region almost flat. Orbit not reaching dorsal contour of head in lateral view. Mouth large, maxilla and premaxillary process extending to vertical level of the posterior end of the orbit.

Dentition: Many small conical teeth embedded in premaxilla, prevomer, and palatine, the prevomer being with 10 more additional large canine-like teeth. Dentary is also with many small teeth on outer region, plus 9 large canine-like teeth medially on each side (Fig. 3).

Colour: In alcohol, dorsal side of body brown or darkish brown, ventral side whitish, 12-14 alternate dark and whitish transverse bars on the sides. Black spots scattered throughout the body 4-5 rows of spots on dorsal fin, caudal fin with distinct 14-15 zigzag cross bars at irregular intervals where the interspace between two bars is $2/3^{\text{rd}}$ of the zigzag bar. Pectoral fin with 5-6 black bars. Edges of dorsal and anal fins white.

Distribution: Presently known from Lohit river at Tezu, Lohit district, Arunachal Pradesh (Brahmaputra drainage), India (Fig. 4).

Etymology: Named after the melanophores present on each scale on flanks.

Discussion: *Channa melanostigma* is similar to *C. stewartii* in overall body appearance, head shape, i.e., generally rounded in lateral view and coloration, numerous small black spots scattered on body, narrow and pointed snout, lateral line scales 46-47, scale rows between preopercular angle and posterior border of orbit 4-6, predorsal scales 13, maxilla and premaxillary process extending to vertical level of the posterior end of the orbit, pectoral fin rays 14-15, caudal fin rays 13-14, and scales above the lateral line $3\frac{1}{2}$. However, *C. melanostigma* is distinct particularly in having the caudal bars, more number of branchial toothplates, vertebra and scales below lateral line.

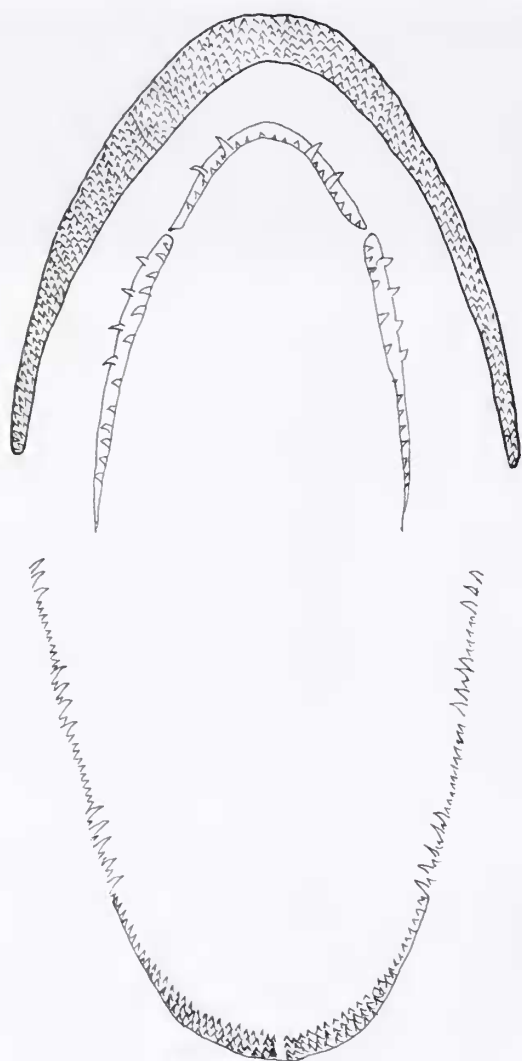


Fig. 3: Dentition of *Channa melanostigma* sp. nov. (MUMF-Per 46)

The new species is also similar to *C. gachua* in having white coloration at the edge of dorsal and anal fins, lateral line 46-47, and presence of 5-6 black bars on the pectoral fin. However, *C. melanostigma* is distinguished from both the species as in diagnosis above. But it is distinguished from the latter in its more number of vertebrae and more posteriorly inserted dorsal fin.

Channa melanostigma is distinguished from *C. aurantimaculata* in having less number of dorsal fin rays (36-37 vs. 45-47), last dorsal fin ray inserted between 41st and 43rd vertebrae (vs. 46th and 47th), cheek scales 5 vs. 10 and less number of circumpeduncular scales (28 vs. 34), from *C. punctatus* in having 50-51 vertebrae (vs. 35); from *C. amphibeus*, in its less numbers of lateral line pierced scales (46-47 vs. 80-81); from *C. barca*, in having continuous black bars in the pectoral fin (vs. dotted bars); from *C. bleheri* in having pelvic fin (vs. absence); from *C. harcourtbutleri* in

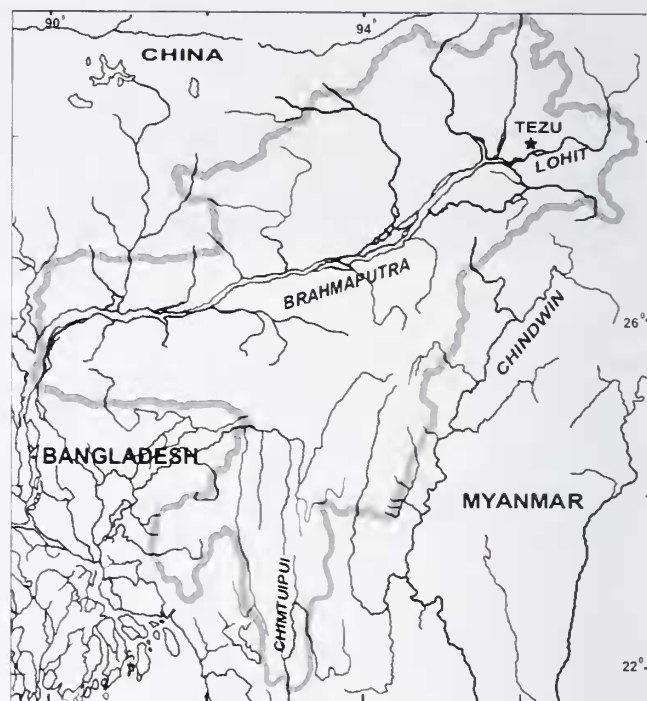


Fig. 4: Collection sites of *Channa melanostigma* sp. nov. from NE India

having 10 scales below the lateral line (vs. $\frac{1}{2}7 - \frac{1}{2}8$) and from *C. marulius* and *C. striata* by the presence of two large cycloid scales on each side of the undersurface of lower jaw (vs. absence).

The new species is easily distinguished from *Channa nox* of China and *C. orientalis* of Sri Lanka in presence of pelvic fin (vs. absence); *C. panaw* of Myanmar in having 27-28 circumpeduncular scales (vs. 21-24); *C. ornatipinnis* of Myanmar in absence of three dorsal fin blotches (vs. presence); and *C. pulchra* of Myanmar in absence of one anterior dorsal fin blotch (vs. presence). The species is also distinguished from *C. argus* of China, *C. baramensis* of Malaysia; *C. bankanensis*, *C. lucius*, *C. cyanospilos*, *C. melanopterus*, *C. melasoma*, *C. micropeltes*, and *C. pleurophthalmus* of Indonesia by the presence of two large cycloid scales on each side of the undersurface of lower jaw (vs. absence).

Hora and Mukerji (1934) synonymised *Channa harcourtbutleri* with *C. gachua*. However, Ng *et al.* (1999) resurrected the species from synonymy and reported it to be endemic in Inle lake of Myanmar. Menon (1954) listed *C. harcourtbutleri* from Manipur without any collection data. This was probably a misidentification of *C. gachua*.

Vishwanath and Geetakumari (2009) recognized two groups of *Channa* in north-east India, namely 'gachua-group', with large cycloid scales on each side of the undersurface of lower jaw which included *C. amphibeus*, *C. aurantimaculata*,

C. barca, *C. bleheri*, *C. gachua*, *C. punctata*, *C. stewartii* and 'marulius-group' without the scales as in the above which included *C. striata* and *C. marulius*. The new species under description belong to the 'gachua-group' as its has large cycloid scales.

General inventory and phylogenetic study of the diverse species of *Channa* in north-east India and adjoining areas is awaited.

Comparative Material: *Channa amphibeus*: ZSI 11435, 1, neotype, 184.6 mm SL; INDIA: Northern Bengal. *Channa aurantimaculata*: MUMF-Per 01, 2, 175-182.0 mm SL; INDIA: Arunachal Pradesh, Lohit district, Teju river. GUBM (Guwahati University Biodiversity Museum uncat., 1 ex, 345 mm SL; INDIA: Assam, Gujjan. *Channa barca*: ZSI 1387, 1 ex, 260.7 mm SL; INDIA: Calcutta. GUBM uncat., 1 ex, 447.7 mm SL, INDIA: Assam, Guwahati, Marigoan Market; MUMF-Per 44 (2), 295-298 mm SL, INDIA: Assam, fringe area of Pobitora Wildlife Sanctuary, Morigaon. *Channa bleheri*: MUMF-Per 03, 2, 148.4-149.1 mm SL, INDIA: Arunachal Pradesh, Dikrong river, Doymukh; BMGU uncat., 1 ex, 121.0 mm SL, INDIA: Assam, Tinsukia district. *Channa gachua*: ZSI F 2705, 1 ex, 246.0 mm SL, BANGLADESH: Bulagunj, Sylhet; MUMF-Per/0004 (6), 112.8-112.9 mm SL, INDIA: Manipur, Nambul River, Singda. *Channa harcourtbutleri*: ZSI F 9439, 1 ex, 189.0 mm SL, MYANMAR: Inle Lake, S. Shan states. *Channa marulius*: MUMF uncat.,

1 ex, 488.0 mm SL, INDIA: Manipur, Barak river, Vanchengphai, Tamenglong district; MUMF-Per 25, 7, 97.8-151.6 mm SL, Chindwin Basin, Moreh, India. *Channa punctata*: ZSIF 7688, 1 ex, 144.6 mm SL, INDIA: Bihar, Bhagmati River, Purnea, Champaran district; MUMF-Per 13, 6, 95.6-105.9 mm SL, INDIA: Manipur, Nambul River, Singda. *Channa stewartii*: ZSI 10024, 1, 170.0 mm SL, INDIA: Meghalaya, Shillong; MUMF-Per 21, 2, 109.7-155.2 mm SL, INDIA: Arunachal Pradesh, Deopani river, Rowing, Lower Devang Valley district; BMGU uncat., 1 ex, 260.0 mm SL, INDIA: Assam, Gujjan. *Channa striata*: ZSI F 12922, 1 ex, 247.6 mm SL, INDIA: Andhra Pradesh, Cheyyeru river, near Razampeta; MUMF-Per 31, 8, 164.8-187.0 mm SL, INDIA: Manipur, streams near Imphal valley.

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